

All Surface Micromachined Microphone

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All Surface Micromachined Microphone

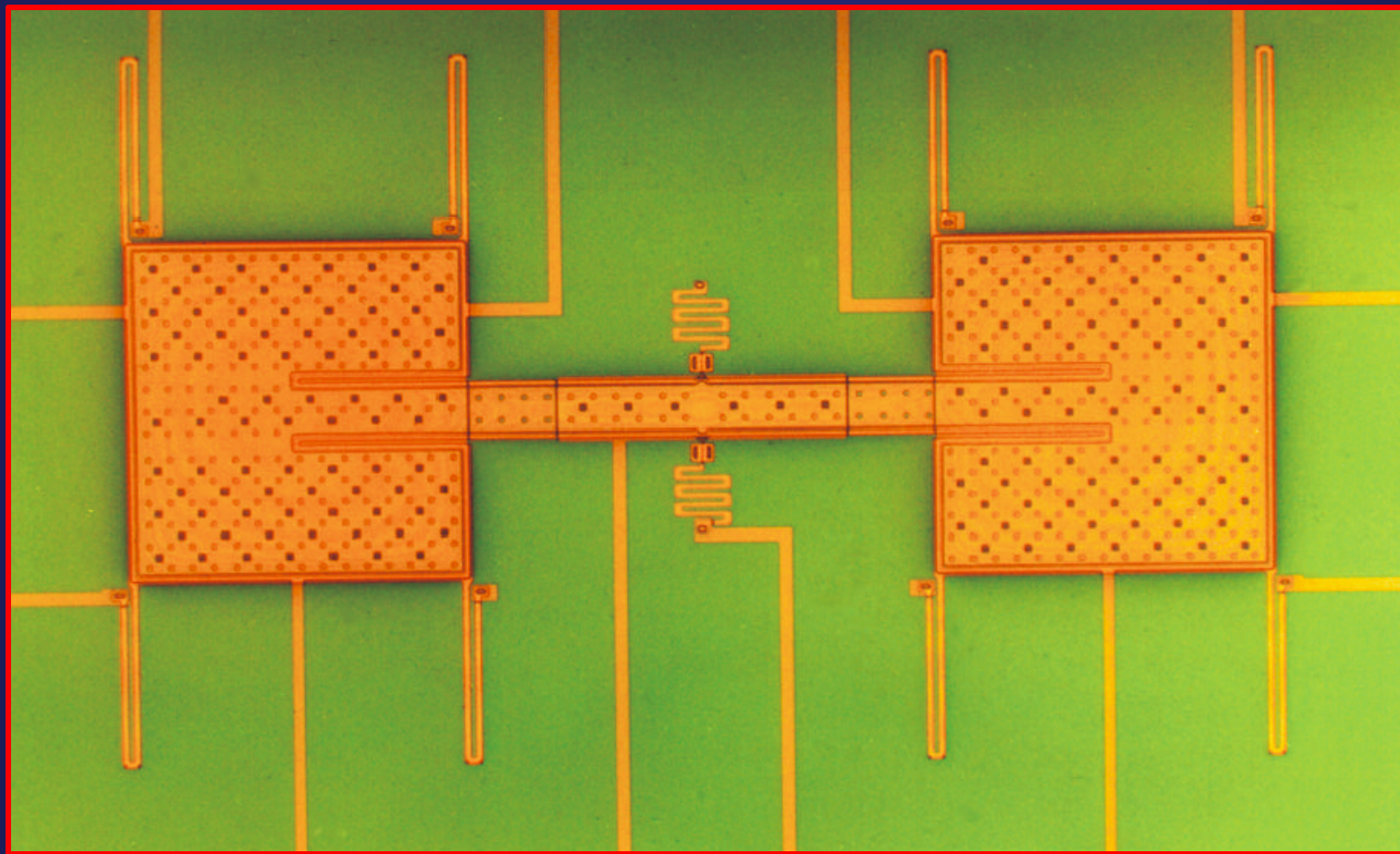
Advantages

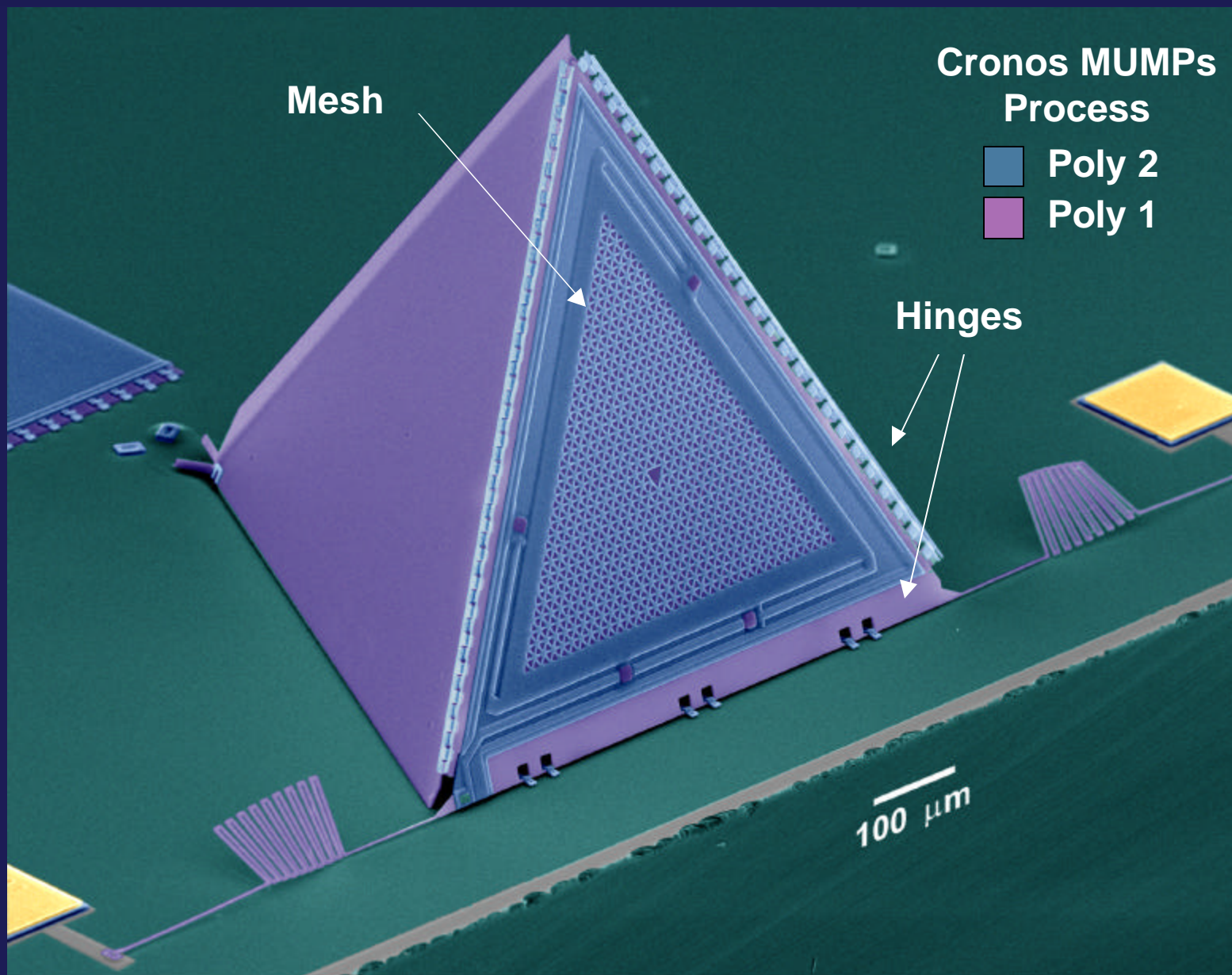
- Freedom of Design → more functionality
- Very Suitable for Integration with electronics
- Well-established Commercial Process
- Foundries

Disadvantages

- | | <i>Solution</i> |
|------------------------------------------------|-----------------|
| • Small Gaps → damping Out of Plane Structures | |
| • Some Assembly Required | Self Assembling |

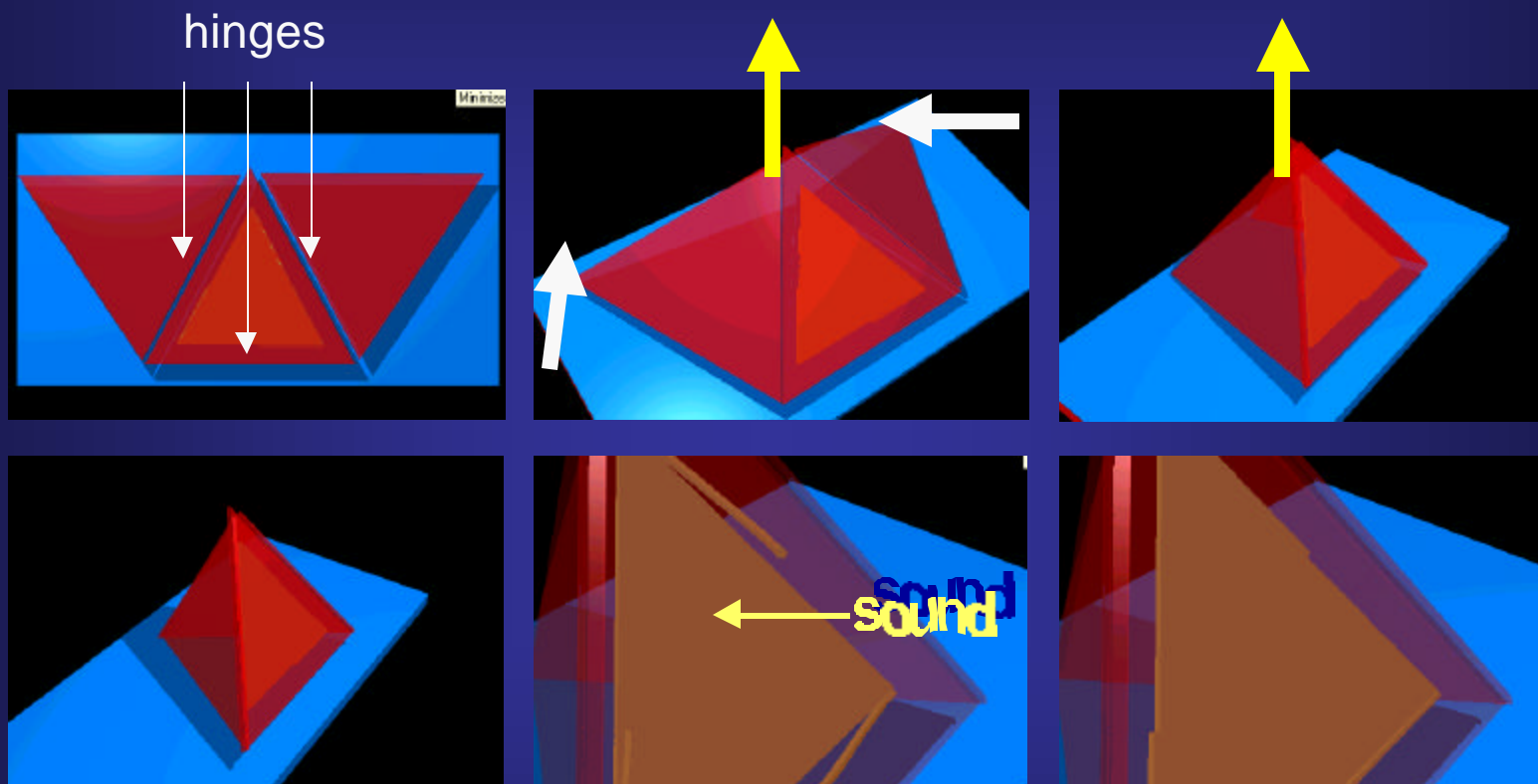
Early Surface Microphone

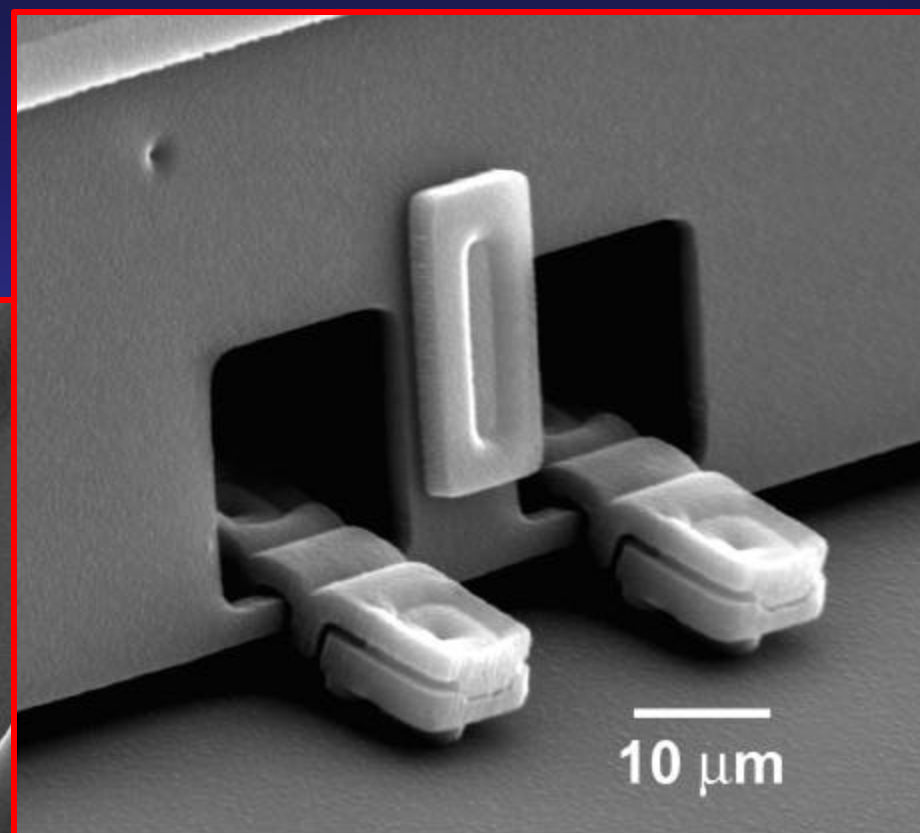
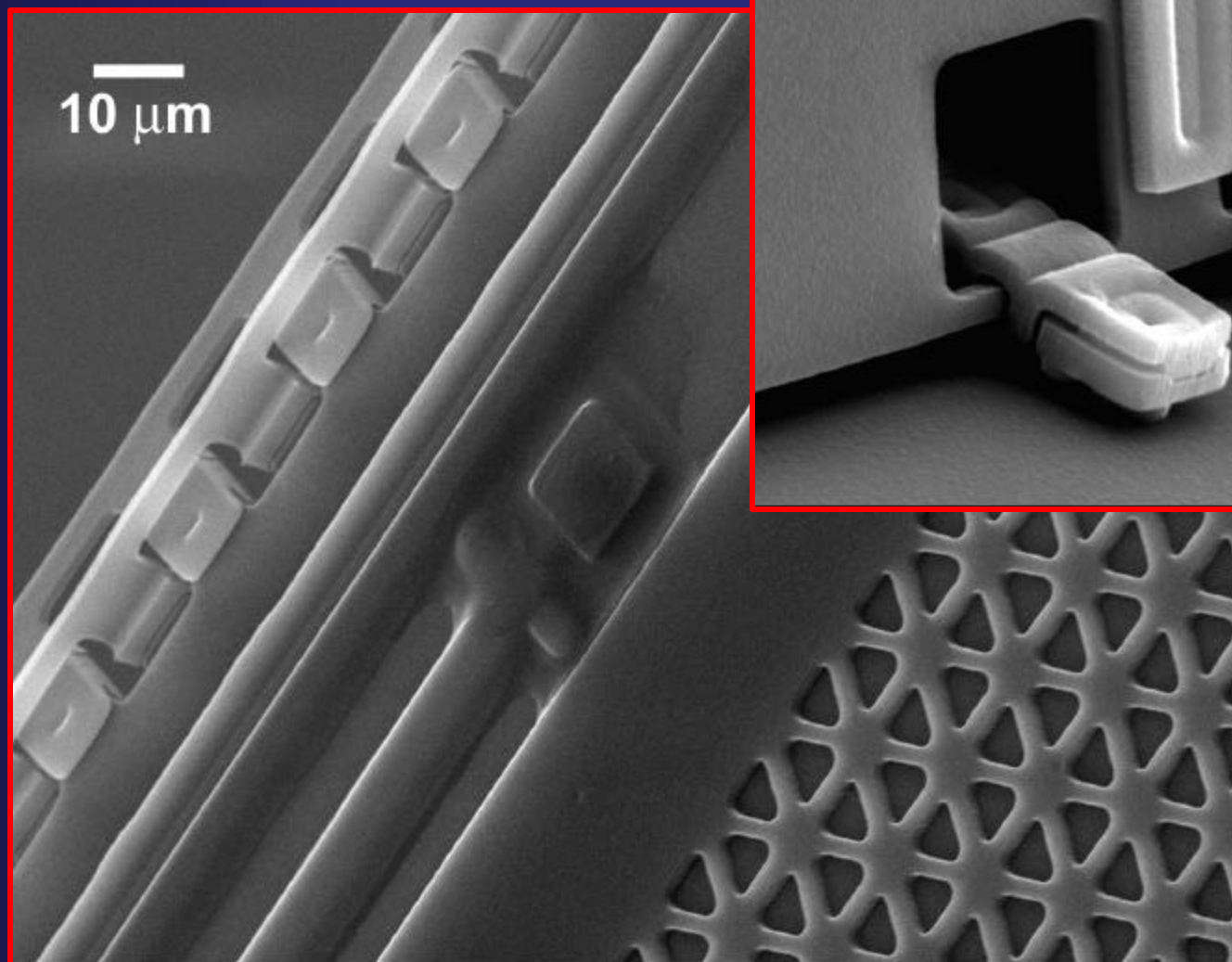




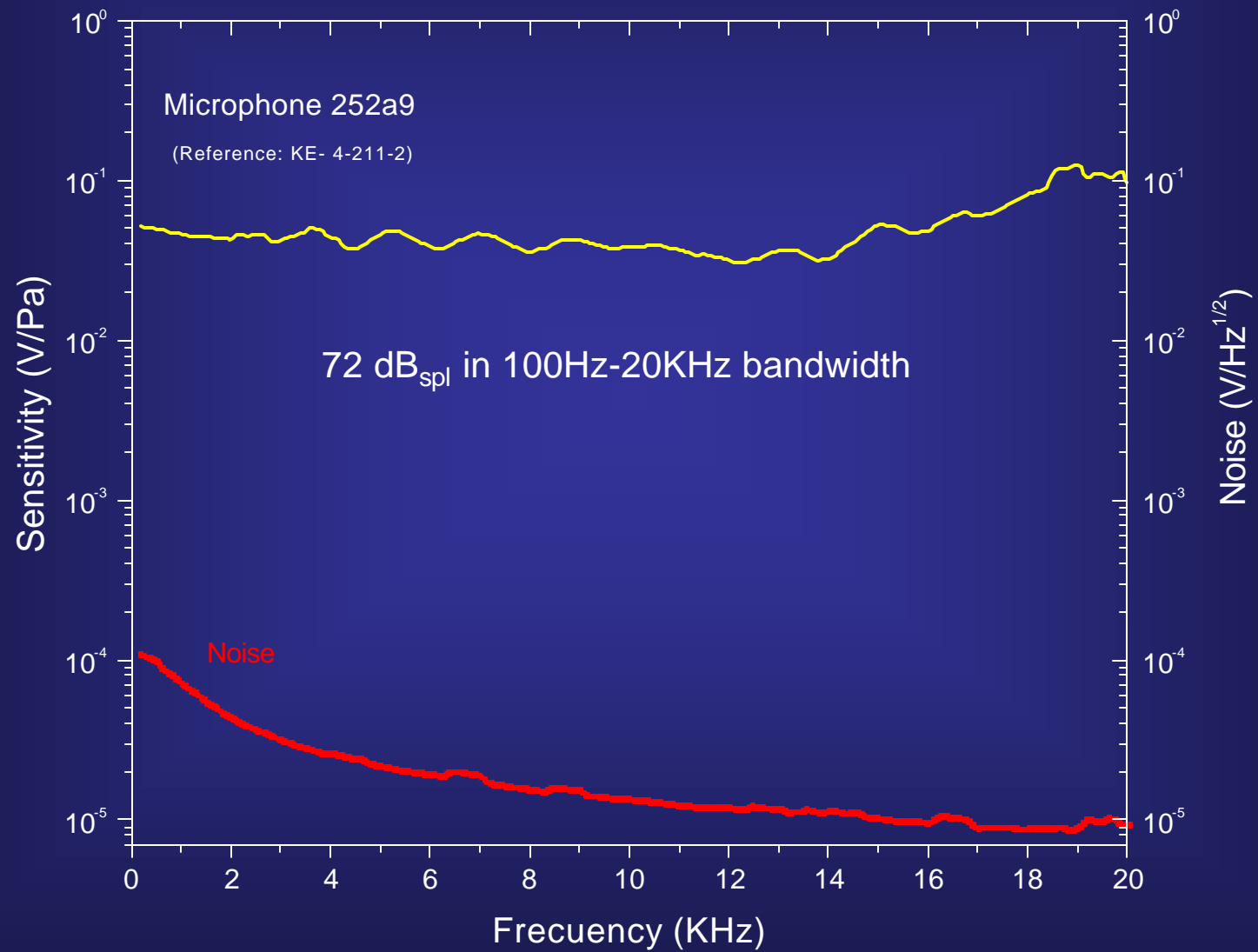
SEM Photograph

Tent Assembly and Working Principle



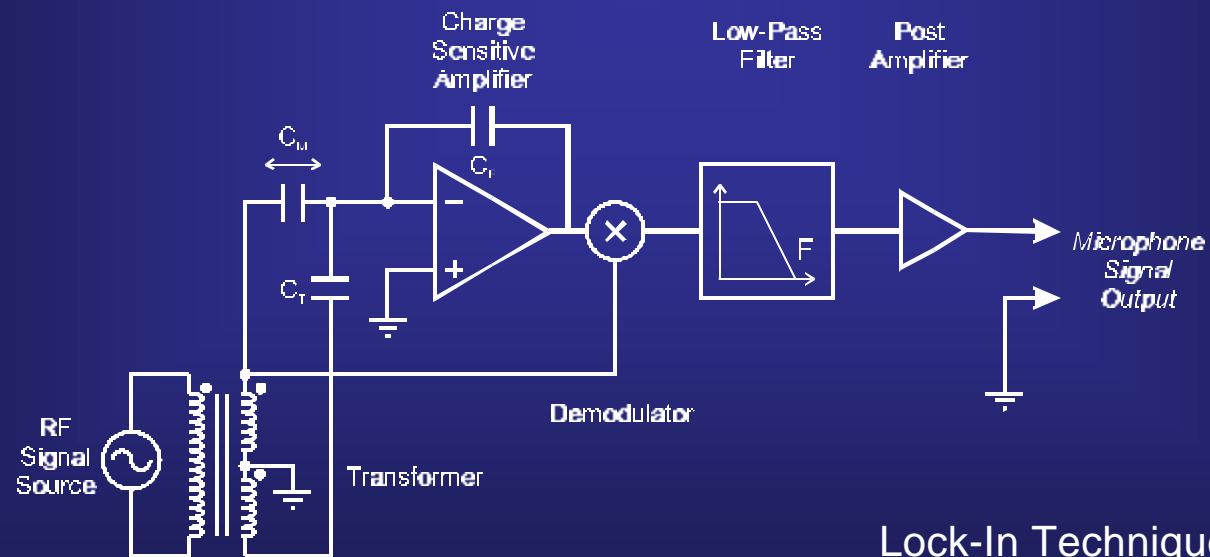
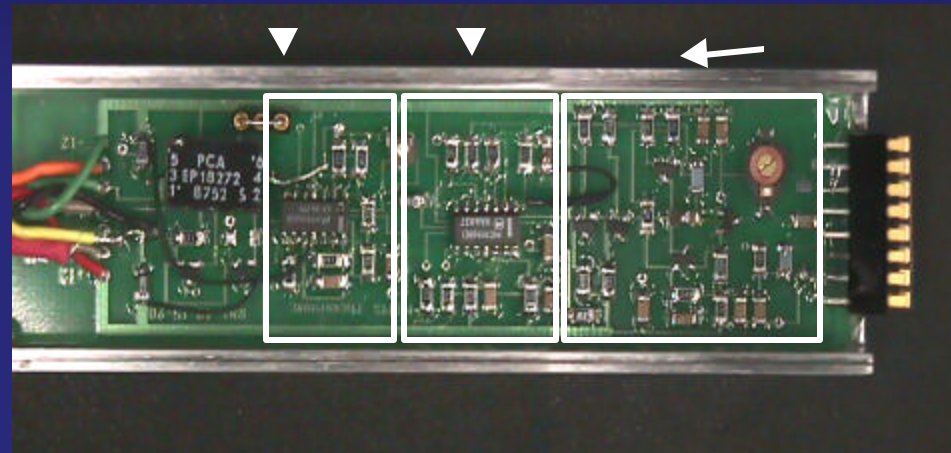


Frequency Response



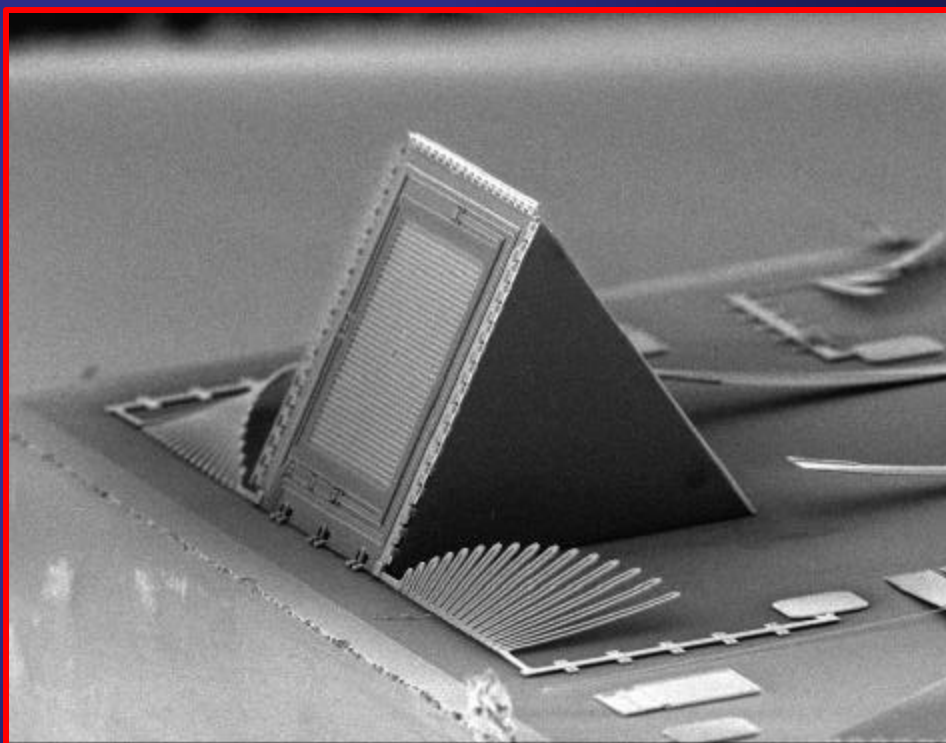
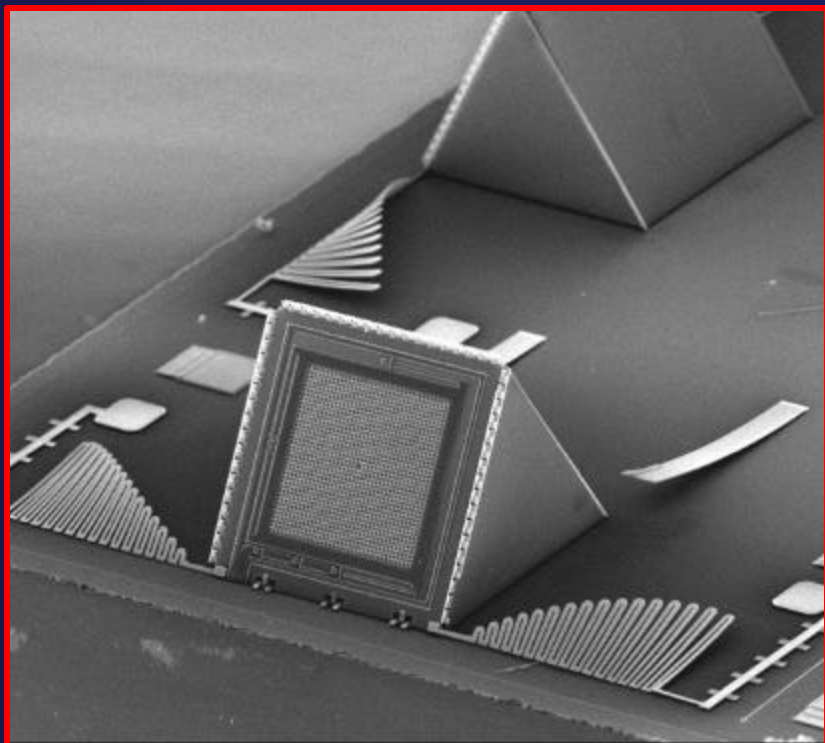
Detection Circuit

gain and filtering demodulator charge amplifier

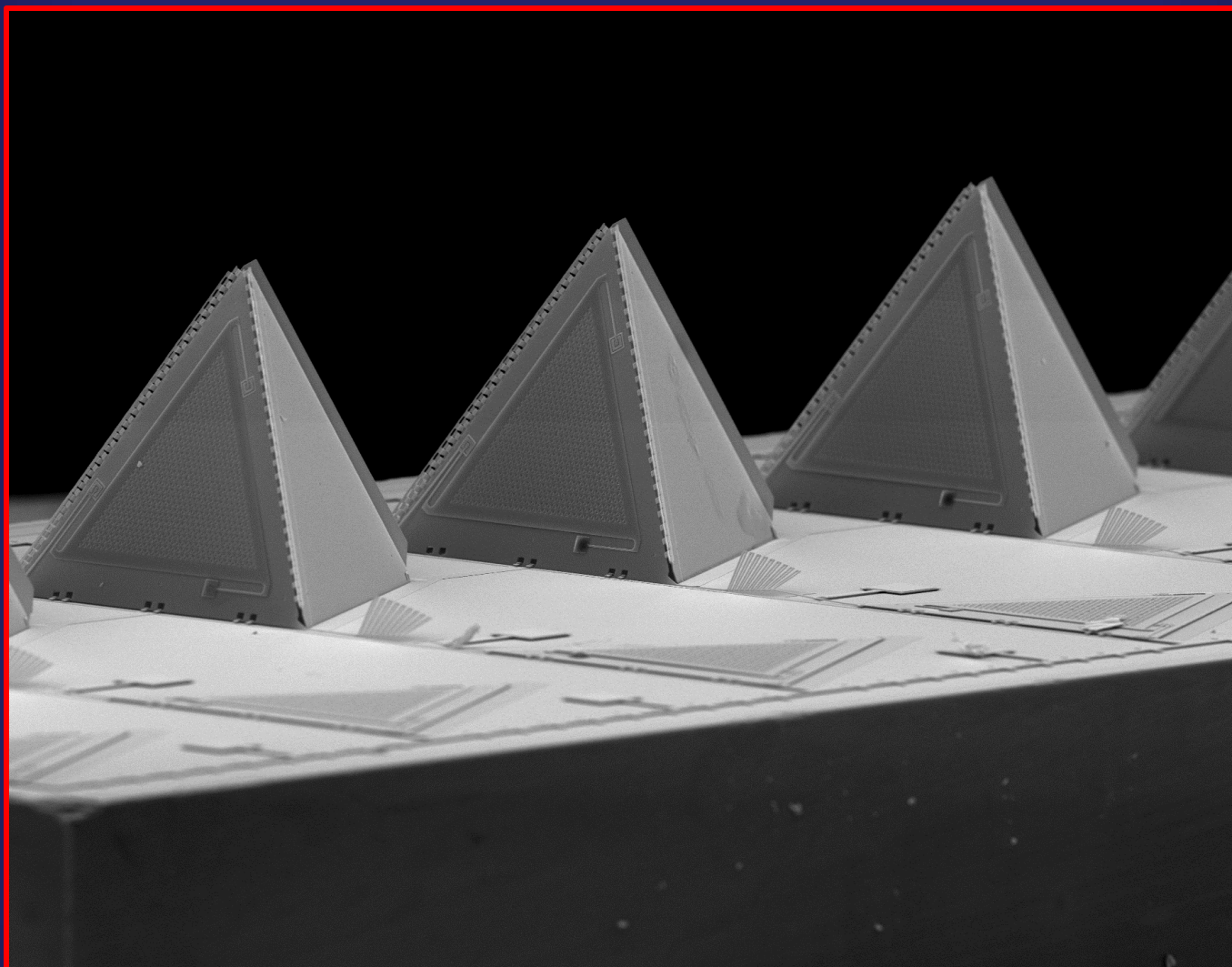


Lock-In Technique

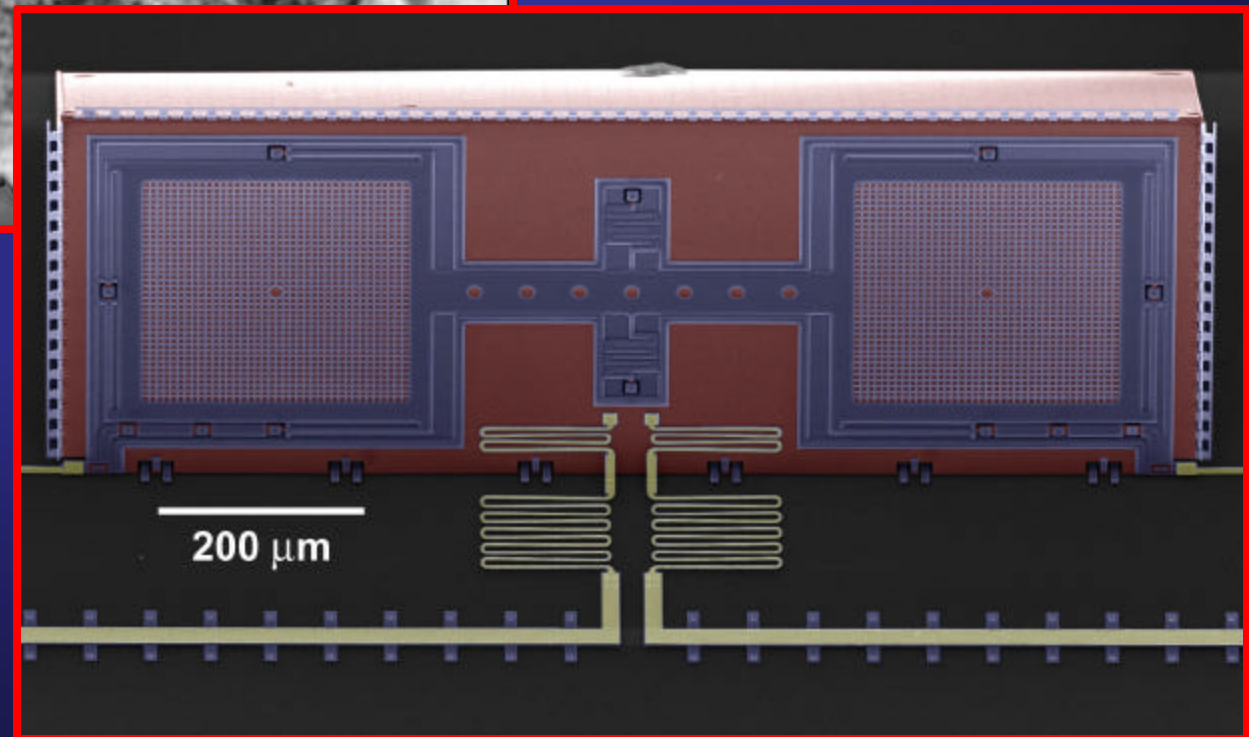
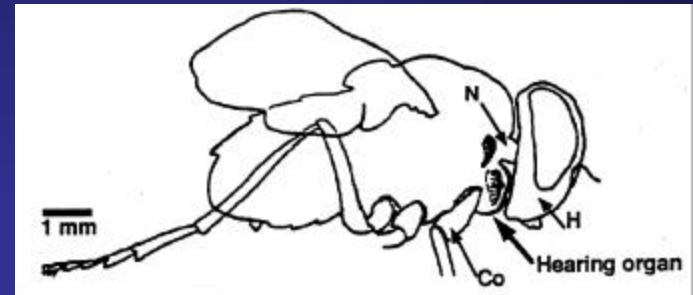
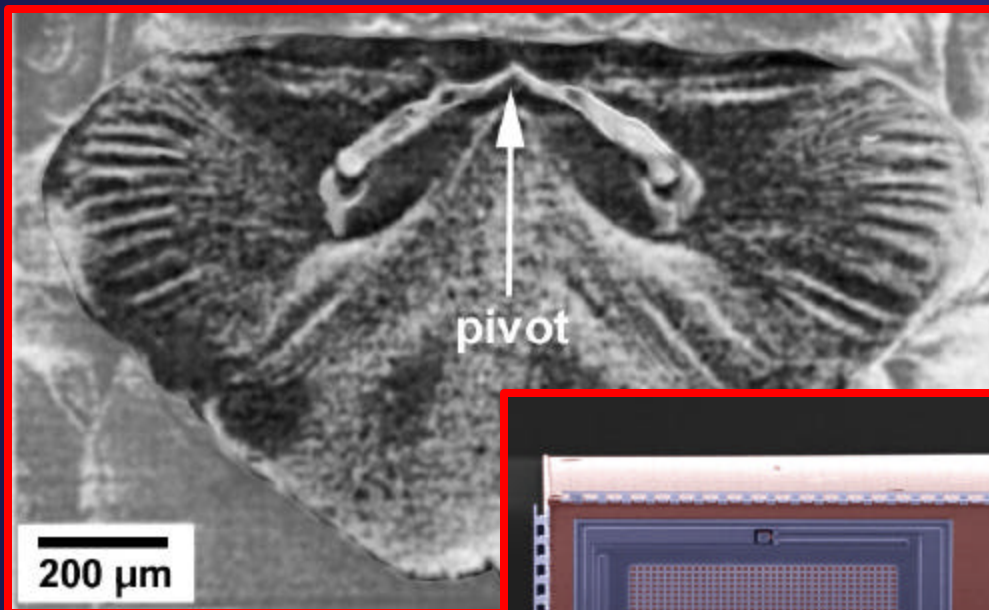
1.5MHz, 1V_{RMS} carrier



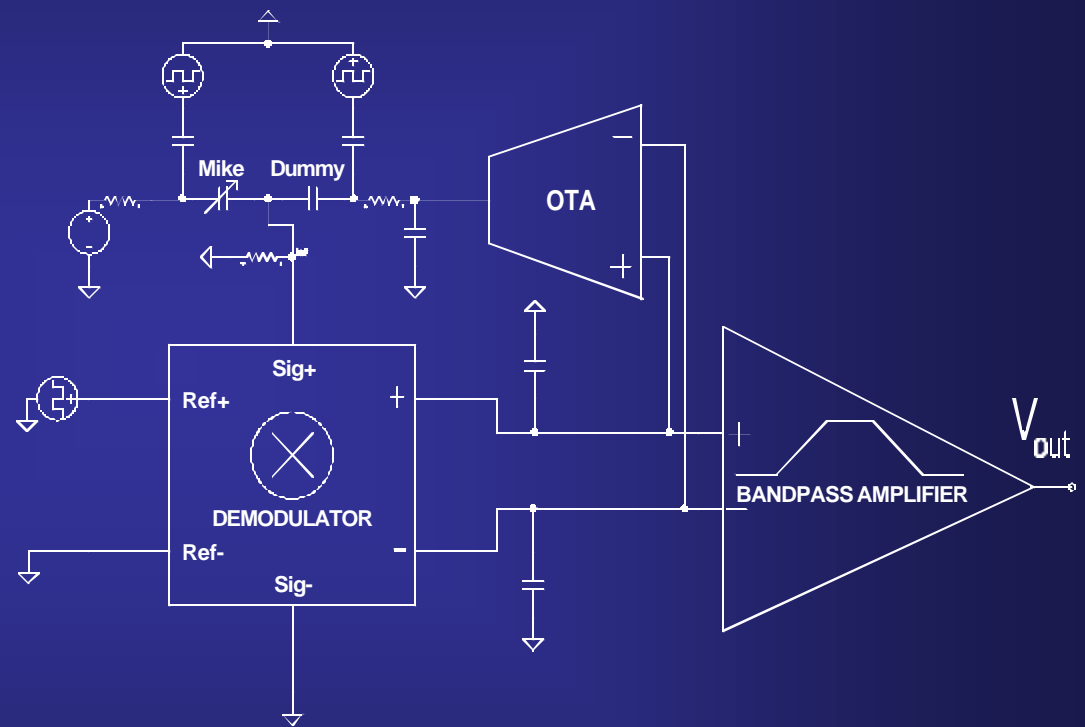
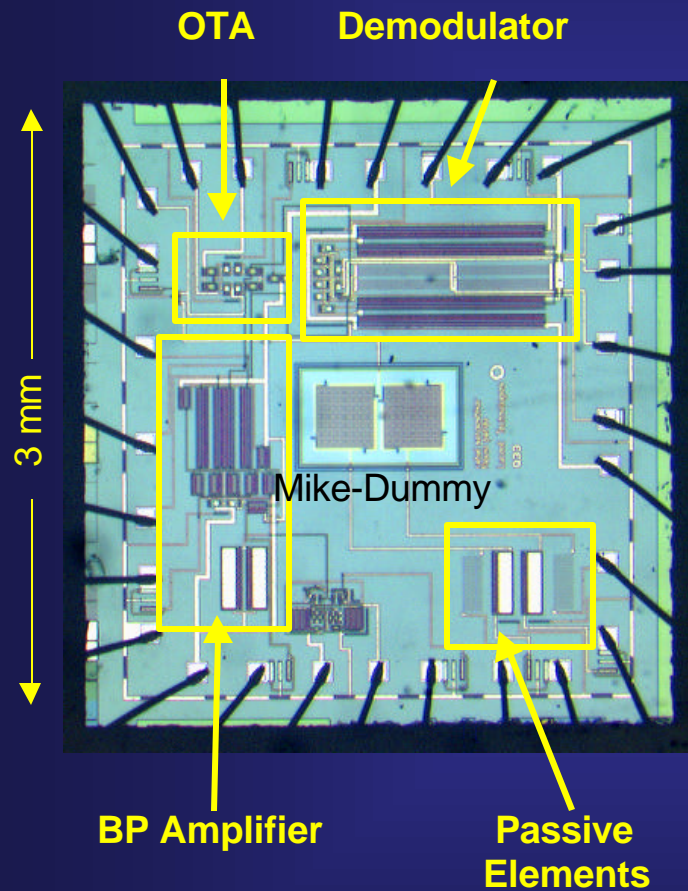
Microphone Arrays



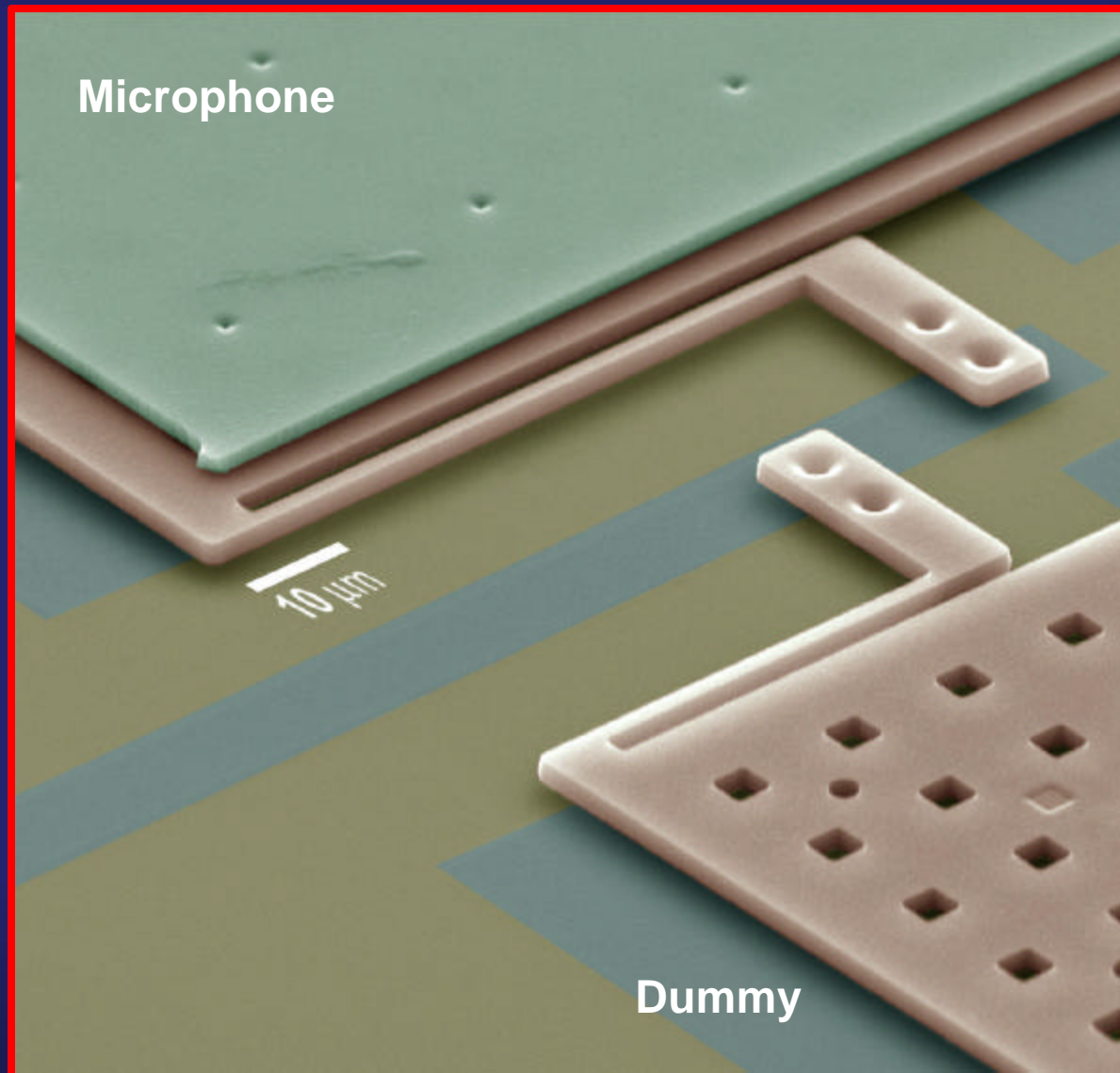
Biologically Inspired Directional Si Microphone



iMEMS sensor

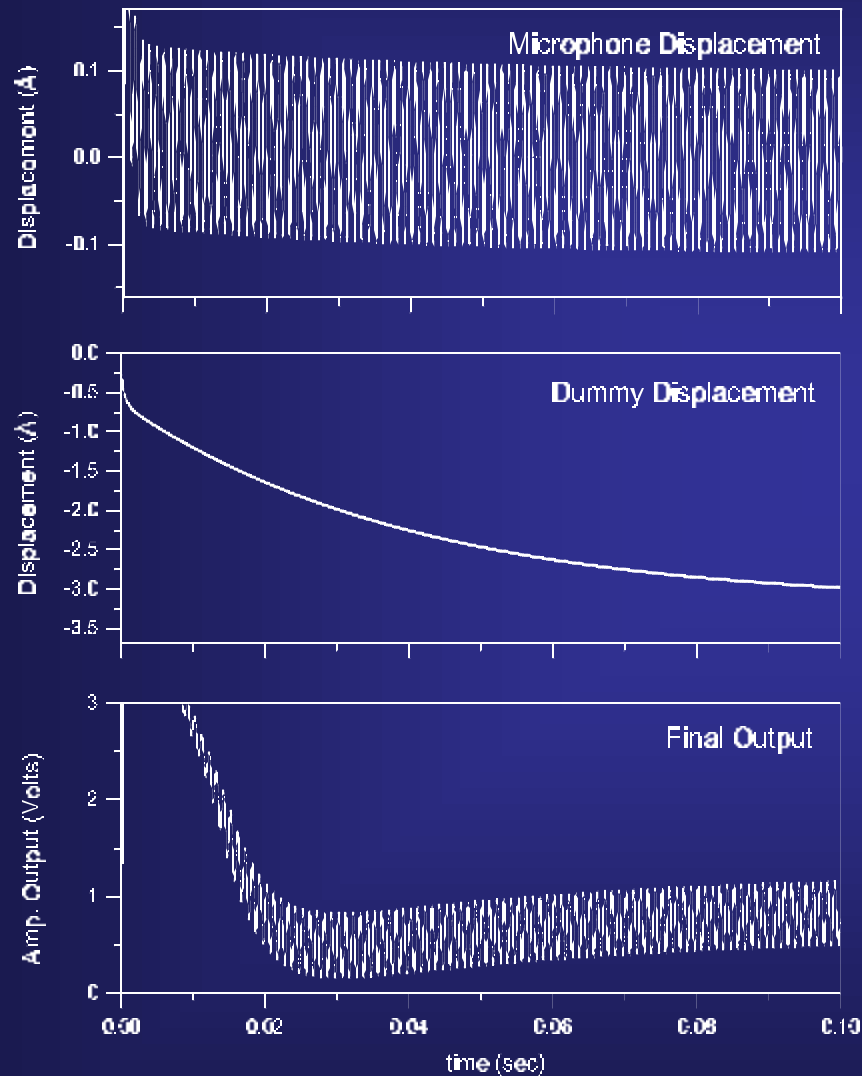


iMEMS sensor detail



SPICE simulations and experiments

MEMS Microphone Simulation Results



Experimental Data

